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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/603,302

Filing Date: June 25, 2003

Appellant(s): WU ET AL.

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Alan K. Stewart  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 10/21/2008 appealing from the Office action mailed 5/15/2008.

**(1) Real Party of Interest**

A statement identifying the real party of interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

2003/0058930	Swada et al	03-2003
6,469,988	Yang et al.	10-2002

7,027,499

Peon et al.

04-2006

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 4, 6 – 9, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sawada et al. (USPAP 2003/0058930) in view of Yang et al (US Patent 6,469,988).

Regarding claim 1, Sawada et al teach a communication receiver comprising an input for receiving from a communication transmission apparatus an input analog communication signal (see figure 1, input signal to the pre-filter 12 and paragraph 4), a feed-forward equalizer coupled to said input for producing in response to said input analog communication signal and equalized analog communication signal (see figure 1, component 12, and 13 and paragraph 4), a sampler coupled to said feed-forward equalizer for producing digital communication information in response to said equalized analog communication signal (see figure 1, component 14 and page 1, paragraph 4, lines 11 - 13), and a feedback equalizer coupled between said sampler and said feed forward equalizer for controlling said feed forward equalizer in response to said digital

communication information (see figure 1, component 16 and paragraph 4); wherein feedback equalizer includes a digital to analog conversion portion having an input coupled to said sampler for receiving said digital communication information (see figure 1, component 19), said digital to analog conversion portion having an output coupled to said feed forward equalizer (see figure 1, output signal from component 19 to component 13). Sawada et al is silent on said digital to analog conversion portion includes plurality of digital to analog converters having respective inputs coupled to said sampler and respective outputs coupled to said feed forward equalizer. However, in analogous art, Yang et al teach an filter having digital to analog conversion portion includes plurality of digital to analog converters having respective inputs coupled to said sampler and respective outputs coupled to said feed forward equalizer (see abstract and figure 6 and 12). Therefore it would be obvious to an ordinary skilled in the art at the time the invention was made to incorporate the teachings of plurality of digital to analog converters in Sawada et al filter. The motivation or suggestion to do so is to realize plurality of tap coefficients (see column 2, line 12 – 40).

Regarding claim 2, which inherits the limitations of claim 1, Sawada et al further teach said feed forward equalizer includes a wire summation node (see component 13).

Regarding claim 4, which inherits the limitations of claim 3, Sawada et al further teach said feed forward equalizer includes a wire summation node (see component 13).

Regarding claim 6, which inherits the limitations of claim 1, Yang et al further teach each of the said digital to analog converters includes a current source digital to analog converter (see column 2, line 18 – 40).

Regarding claim 7, which inherits the limitations of claim 6, Yang et al further teach said outputs of said digital to analog converters are connected together at an input of said feed forward equalizer (see column 2, lines 18 –40).

Regarding claim 8, which inherits the limitations of claim 1, Yang et al further teach said feed forward equalizer includes a wire summation node (see column 2, lines 18 – 40).

Regarding claim 9, which inherits the limitations of claim 1, Sawada et al further teach said feedback equalizer includes a delay apparatus coupled between said sampler and said digital to analog converters for providing said digital communication information to said digital to analog converters at different point in time (see abstract and column 2, lines 18 – 40).

Regarding claim 11, which inherits the limitations of claim 1, Sawada et al further teach said feedback equalizer includes a control input for receiving control information, said feedback equalizer responsive to said control information for controlling said feed forward equalizer, said control information designed to minimize interference at temporal boundaries between data symbols carried by said equalized analog communication channel (see figure 1, component 17, the inputs w0-w7).

Regarding claim 12, which inherits the limitations of claim 11, Sawada et al further teaches said input analog communication signal is produced by the communication transmitter apparatus in response to second control information (see figure 1, the output signal of component 14), said first control information designed in

conjunction with the second control information to minimize interference at points in time between said temporal boundaries (see figure 1, components 13, 14, 15 and 16).

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sawada et al. (USPAP 2003/0058930) in view of Yang et al (US Patent 6,469,988) and further in view of Peon et al (US patent 7027499).

Regarding claim 10, Sawada et al in view of Yang et al is silent on the communication signal carries a SONET communication. However in analogous art, Peon et al teach communication system carries a SONET signal. Therefore it would be obvious to an ordinary skilled in the art at the time the invention was made to have process the SONET signal.

#### **(10) Response to Argument**

With respect to claims 1, 2, 4, 6 - 9, 11, and 12, Applicant group claims 1, 2, 4, 6 - 9, 11, and 12 together and limit the argument on claim 1 only. In particular, Applicant argues that "*Claim 1 includes "... said digital-to-analog conversion portion includes a plurality of digital-to-analog converters ... having respective outputs coupled to said feedforward equalizer..."*. U.S. Patent Application Publication No. 2003/0058930 and U.S. Patent No. 6,469,988 do not show, teach, or suggest the above recited limitations of claim 1. U.S. Patent Application Publication No. 2003/0058930 and U.S. Patent No. 6,469,988 do not teach how the plurality of digital to analog converters (DACs) in U.S. Patent No. 6,469,988 would be substituted into the device of U.S. Patent Application Publication No. 2003/0058930 to obtain the device of claim 1. In U.S. Patent No.

6,469,988, the DACs are used as tail current sources for respective differential pair stages. The outputs of each DAC in U.S. Patent No. 6,469,988 are not coupled to a single device such as a feed forward equalizer of claim 1."

Response --- Sawada et al (US Patent Application Publication No. 2003/0058930) teach Decision feedback equalizer in figure 1. Yang et al teach in figure 5 a FIR filter having plurality of tap coefficients. In figure 12 Yang et al teach replacing the digital filter coefficient multiplier with DAC and summing the analog currents to provide the filtered output. Further Yang et al teach "[a] plurality of digital to analog converters (DACs) generate analog currents that are analog of tap coefficients of the FIR filter model". Yang et al further teach "[t]he drains of the input devices of the differential pair stages (DACs) are connected in parallel to common complementary load circuits ...The parallel connection to common load circuits acts to sum the currents sunk (if any) by each of the commonly connected input devices. This current summation is the analogue of the FIR accumulator" (see abstract). Thus Yang et al teach an equalizer outputting analog output using plurality of DACs. Therefore it would have been obvious to an ordinary skilled in the art at the time the invention was made to replace the digital coefficient multipliers 17, and summer 8 and DAC 19 of Sawada with plurality of DAC's and current summer of Yang et al. Therefore Sawada et al in view of Yang et al teach all cited limitations.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

With respect claim 10, the Applicant makes same argument as the argument applied to claim 1. Therefore the same response applied to the argument with respect to claim 10 above is applied here.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

Art Unit: 2611

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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